

REMARKS/ARGUMENTS

In response to the Applicant's amendment and arguments, the Examiner has withdrawn his previous Section 103 rejections. New grounds of rejections have now been made for claims 1-2, 9, under 35 U.S.C. 102(e) as being anticipated by Bronicki (2003/218385), and claims 1-2, 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Braus et al. (DE 2639187).

In response, the applicants have reviewed the newly cited references in detail and believe that the claims are patentably distinguishable thereover of the reasons to be discussed hereinbelow.

The present invention involves an energy recovery system for extracting waste heat from an engine using a single heat exchanger for transferring heat from a plurality of sources within the engine.

The Bronicki reference describes a hybrid power generating system having a primary power unit for producing electric power and a secondary power unit in the form of a closed cycle vapor turbine (CCVT). The secondary power unit is heated by the exhaust of the primary power unit and can be heated by a separate back up burner. The burner is completely separate from the primary power unit and is used when the primary power unit is out of operation.

With respect to the Bronicki reference, the Examiner has said that "The heat exchanger 58A is adapted to transfer heat from two sources consisting in the heat contained in two fluid flows within the engine (underlining added)". The applicants respectfully disagree.

The Bronicki reference explicitly discloses in Figures 3, 4, and 9-12 that the primary power unit is separate from, and uniquely set apart from the burner. The dashed boundary line of the figures denotes the secondary power unit or CCVT includes the burner. Moreover, the primary power unit is an engine of some form, (e.g., gas turbine generator, diesel engine/generator, gas engine generator, stirling engine and the like) (See Bronicki at paragraphs 0017, 0018, 0019). The burner is merely a heater for heating the working fluid in the vaporizer and cannot be confused as being an engine or attributed as being a part of the disclosed engine of

the Bronicki reference. The Bronicki reference clearly distinguishes that the engine and the burner are two distinct and separate components in the system as a whole and are not a single component namely "an engine" as claimed. The Bronicki reference explicitly discloses a single primary power exhaust line 20 where heat from the hot exhaust of the primary power unit (engine) 16 is transferred to the liquid in the vaporizer 58 via heat exchange device 22 (See Bronicki at paragraph 0042). There is no other source of heat from the primary power source (engine) 16 of Bronicki to the heat exchanger 22. The engine of the Bronicki reference has only one source of heat provided to the heat exchanger 22 of the CCVT. That single source is the hot exhaust gases from the engine 16. The additional source of heat disclosed in the Bronicki reference is the burner 56, a distinct and separate device from the engine 16. Therefore, the Bronicki reference discloses a single source of heat from the engine and an additional source of heat from the burner. The Bronicki reference does not disclose "said single heat exchanger is adapted to transfer heat from a plurality of sources within said engine," as claimed in part in claim 1. The Bronicki reference does not disclose "said single heat exchanger is adapted to conduct the flow of two different engine fluids therethrough," as claimed in part in claim 2. The Bronicki reference does not disclose "circulating a plurality of relatively hot fluids from said engine through said at least one heat exchanger," and "circulating said plurality of cooled engine fluids back to said engine," as claimed in part in claim 9.

Thus, although the Examiner has an interesting approach to anticipation, the prior art reference of Bronicki does not disclose each and every claimed element as claimed. Therefore the Bronicki reference does not anticipate claims 1, 2 or 9.

The Braus et al. reference is in the German language and was not translated. However, from Figure 1 it would appear that this reference discloses a diesel engine having a methanol engine jacket cooling system that includes liquid methanol in the cylinder jacket (i.e. a first heat exchanger 1) fluidly coupled to a gas/liquid heat exchanger (i.e. a second heat exchanger 2). The methanol receives heat from the piston/cylinder of the engine and the cooling jacket and is then circulated to the

gas/liquid heat exchanger where the methanol receives heat, after which the methanol is then expanded through a turbine. The methanol is condensed in a separate condenser that is coupled to the turbine exhaust. Separate cooling water cools the methanol in the condenser and the methanol is then returned to the cooling jacket from a reservoir by a pump. The engine exhaust gases are discharged from the engine to the gas/liquid heat exchanger transferring the heat engine exhaust heat to the methanol. The engine exhaust is not returned to the engine.

With respect to the Braus et al. reference, the Examiner asserts that the friction of the piston/cylinder in the engine is one source of heat and the heat of combustion is a second source of heat and that "The engine is therefore adapted to transfer heat from two sources to the fluid of the organic cycle". Again, the applicants respectfully disagree. Rather than showing a single heat exchanger for transferring heat from an engine to an organic rankine cycle fluid flowing through the heat exchanger wherein the single heat exchanger is adapted to transfer heat from a plurality of sources within the engine as recited in applicant's claim 1, the Braus reference discloses two heat exchangers (i.e. the cooling water jacket and the gas/liquid heat exchanger). It appears that the Examiner considers the vessel surrounding the engine to be a single heat exchanger but the gas/liquid heat exchanger which transfers heat from the engine exhaust to the methanol working fluid is a separate, second, heat exchanger.

In respect to the recited claim 2, wherein there is recited that the "Single heat exchanger is adapted to conduct the flow of two different engine fluids therethrough", it should be recognized that Braus et al. shows a single engine fluid, methanol, flowing through the engine cooling jacket to receive the thermal energy generated by the friction of the piston and the heat of the combustion of the fuel in the combustion chamber of the engine. However, there are two different engine fluids flowing in the second heat exchanger (i.e. the gas/liquid heat exchanger). The methanol and the engine exhaust gas both flow through the gas/liquid heat exchanger of the Braus et al. reference. However, the gas/liquid heat exchanger is the second of two heat exchangers for heating the methanol in the system disclosed

in the Braus et al. reference. Thus, that reference fails to disclose a “Single heat exchanger ... adapted to conduct the flow of two different engine fluids therethrough” as recited in claim 2.

In respect to claim 9, wherein there is recited the step of “Circulating a plurality of relatively hot fluids from said engine through said at least one heat exchanger to thereby heat said motive fluid and cool said plurality of fluids” and “circulating said plurality of cooled engine fluids back to said engine”, it should be recognized that in the Braus et al. reference, the motive fluid disclosed is methanol, and the methanol is heated in the engine cooling jacket heat exchanger. The methanol is then again heated in the gas/liquid heat exchanger. Engine exhaust (which is another engine fluid) transfers heat to the methanol as the exhaust gas is cooled, and this occurs in the gas/liquid heat exchanger. The exhaust gas is discharged and is not recirculated back to the engine. Thus, only one engine fluid is cooled, such that the recitation that “and cools said plurality of fluids”, does not occur. Further, in the Braus et al. reference, only one engine fluid is cooled and circulated back to the engine as contrasted to the claim element involving the step of “circulating said plurality of cooled engine fluids back to said engine”. Thus, the Braus et al. reference fails to disclose all of the recited elements of claim 9.

For the reasons discussed hereinabove, the applicants believe that the claims are patentably distinctive over cited references. A reconsideration by the Examiner and a passing of the case to issue is therefore respectfully requested.


If the Examiner wishes to expedite disposition of the above-captioned patent application, he is invited to contact Applicant's representative at the telephone number below.

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Reply to Office Action of August 10, 2005

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-0289.

Respectfully submitted,

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